

WHAT IS CLAIMED IS:

1. An illumination apparatus comprising:

an illuminant which radiates diffused light from an outgoing plane and generates heat;

5 a light guiding member configured to guide the diffused light from the illuminant while reflecting the diffused light at the internal surface thereof, the light guiding member including: an incident end which is close to the outgoing plane of the illuminant, and 10 into which the diffused light is incident and which is larger than the outgoing plane of the illuminant; and an outgoing end which is larger than the incident end; and

15 a holding member configured to integrally hold the illuminant and the light guiding member at a predetermined interval, the holding member including: a heat conducting portion configured to conduct the heat generated at the illuminant; and a heat radiating portion configured to radiate heat from the heat 20 conducting portion.

2. The apparatus according to claim 1, wherein the holding member holds the illuminant and the light guiding member so as to be relatively movable while maintaining the illuminant and the light guiding member at a predetermined interval.

25 3. The apparatus according to claim 1, wherein the holding member includes a heat insulating portion

configured to suppress conduction of heat between the heat radiating portion and the light guiding member.

4. The apparatus according to claim 3, wherein the heat insulating portion has a cross sectional area 5 smaller than that of the heat conducting portion.

5. The apparatus according to claim 3, wherein the heat insulating portion is formed from a material whose heat conductivity is lower than the heat conductivity of the heat conducting portion.

10 6. The apparatus according to claim 3, wherein a translucent heat insulating member having a low heat conductivity is interposed between the illuminant and the light guiding member.

15 7. The apparatus according to claim 1, wherein the holding member provides an air flow path between the illuminant and the light guiding member.

20 8. The apparatus according to claim 1, wherein the light guiding member includes a light guiding element configured to transmit the light incident from the incident end, to the outgoing end by total reflection.

25 9. The apparatus according to claim 1, wherein the light guiding member has a hollow structure in which the side surface is formed from a reflective mirror, and transmits the light incident from the incident end, to the outgoing end by reflection.

10. A display apparatus comprising:

an illumination apparatus including:

an illuminant which radiates diffused light from an outgoing plane and generates heat;

5 a light guiding member configured to guide the diffused light from the illuminant while reflecting the diffused light at the internal surface thereof, the light guiding member having: an incident end which is close to the outgoing plane of the illuminant, and into which the diffused light is incident and which is 10 larger than the outgoing plane of the illuminant; and an outgoing end which is larger than the incident end; and

15 a holding member configured to integrally hold the illuminant and the light guiding member at a predetermined interval, the holding member having: a heat conducting portion configured to conduct the heat generated at the illuminant; and a heat radiating portion configured to radiate heat from the heat conducting portion;

20 an illumination lens configured to condense the light from the outgoing end of the light guiding member of the illumination apparatus; and

25 an image display member disposed in the vicinity of the rear side focal point position of the illumination lens.

11. The apparatus according to claim 10, wherein the illumination lens is disposed further such that the

outgoing end of the light guiding member is positioned at the front side focal point position.

12. The apparatus according to claim 10, wherein, given that a width across dimension of the image display member is  $2W$  and a focal length of the illumination lens is  $L$ , the light guiding member makes a maximum angle of the light ray radiated from the outgoing end to be  $\tan^{-1}(W/L)$  or more.

13. The apparatus according to claim 10, wherein the holding member holds the illuminant and the light guiding member so as to be relatively movable while maintaining the illuminant and the light guiding member at a predetermined interval.

14. The apparatus according to claim 10, wherein the holding member includes a heat insulating portion configured to suppress conduction of heat between the heat radiating portion and the light guiding member.

15. The apparatus according to claim 14, wherein the heat insulating portion has a cross sectional area smaller than that of the heat conducting portion.

16. The apparatus according to claim 14, wherein the heat insulating portion is formed from a material whose heat conductivity is lower than the heat conductivity of the heat conducting portion.

25 17. The apparatus according to claim 14, wherein a translucent heat insulating member having a low heat conductivity is interposed between the illuminant and

the light guiding member.

18. The apparatus according to claim 10, wherein the holding member provides an air flow path between the illuminant and the light guiding member.

5 19. The apparatus according to claim 10, wherein the light guiding member includes a light guiding element configured to transmit the light incident from the incident end, to the outgoing end by total reflection.

10 20. The apparatus according to claim 10, wherein the light guiding member has a hollow structure in which the side surface is formed from a reflective mirror, and transmits the light incident from the incident end, to the outgoing end by reflection.

15 21. A display apparatus comprising:  
an illumination apparatus including:  
an illuminant which radiates diffused light from an outgoing plane and generates heat;  
a light guiding member configured to guide the diffused light from the illuminant while reflecting the diffused light at the internal surface thereof, the light guiding member having: an incident end which is close to the outgoing plane of the illuminant, and into which the diffused light is incident and which is larger than the outgoing plane of the illuminant; and an outgoing end which is larger than the incident end; and

a holding member configured to integrally hold the illuminant and the light guiding member at a predetermined interval, the holding member having: a heat conducting portion configured to conduct the 5 heat generated at the illuminant; and a heat radiating portion configured to radiate heat from the heat conducting portion;

an image display member disposed in the vicinity of the outgoing end of the light guiding member of the 10 illumination apparatus; and

a projection optical system configured to image an image of the image display member on a projection plane.

22. The apparatus according to claim 21, wherein 15 the holding member holds the illuminant and the light guiding member so as to be relatively movable while maintaining the illuminant and the light guiding member at a predetermined interval.

23. The apparatus according to claim 21, wherein 20 the holding member includes a heat insulating portion configured to suppress conduction of heat between the heat radiating portion and the light guiding member.

24. The apparatus according to claim 23, wherein 25 the heat insulating portion has a cross sectional area smaller than that of the heat conducting portion.

25. The apparatus according to claim 23, wherein the heat insulating portion is formed from a material

whose heat conductivity is lower than the heat conductivity of the heat conducting portion.

26. The apparatus according to claim 23, wherein a translucent heat insulating member having a low heat conductivity is interposed between the illuminant and the light guiding member.

5 27. The apparatus according to claim 21, wherein the holding member provides an air flow path between the illuminant and the light guiding member.

10 28. The apparatus according to claim 21, wherein the light guiding member includes a light guiding element configured to transmit the light incident from the incident end, to the outgoing end by total reflection.

15 29. The apparatus according to claim 21, wherein the light guiding member has a hollow structure in which the side surface is formed from a reflective mirror, and transmits the light incident from the incident end, to the outgoing end by reflection.

20 30. An illumination apparatus comprising:  
an illuminant which radiates diffused light from an outgoing plane and generates heat;  
light guiding means for guiding the diffused light from the illuminant while reflecting the diffused light  
25 at the internal surface thereof, the light guiding means including: an incident end which is close to the outgoing plane of the illuminant, and into which the

diffused light is incident and which is larger than the outgoing plane of the illuminant; and an outgoing end which is larger than the incident end; and

5 holding means for integrally holding the illuminant and the light guiding means at a predetermined interval, the holding means including: a heat conducting portion which conducts the heat generated at the illuminant; and a heat radiating portion which radiates heat from the heat conducting portion.

10 31. A display apparatus comprising:  
an illumination apparatus including:  
an illuminant which radiates diffused light from an outgoing plane and generates heat;

15 light guiding means for guiding the diffused light from the illuminant while reflecting the diffused light at the internal surface thereof, the light guiding means having: an incident end which is close to the outgoing plane of the illuminant, and into which the diffused light is incident and which is larger than the outgoing plane of the illuminant; and an outgoing end which is larger than the incident end; and

20 25 holding means for integrally holding the illuminant and the light guiding means at a predetermined interval, the holding means having: a heat conducting portion which conducts the heat generated at the illuminant; and a heat radiating portion which radiates heat from the heat conducting portion;

an illumination lens which condenses the light from the outgoing end of the light guiding means of the illumination apparatus; and

5 image displaying means disposed in the vicinity of the rear side focal point position of the illumination lens.

32. A display apparatus comprising:

an illumination apparatus including:

10 an illuminant which radiates diffused light from an outgoing plane and generates heat;

light guiding means for guiding the diffused light from the illuminant while reflecting the diffused light at the internal surface thereof, the light guiding means having: an incident end which is close to the outgoing plane of the illuminant, and into which the diffused light is incident and which is larger than the outgoing plane of the illuminant; and an outgoing end which is larger than the incident end; and

20 holding means for integrally holding the illuminant and the light guiding means at a predetermined interval, the holding means having: a heat conducting portion which conducts the heat generated at the illuminant; and a heat radiating portion which radiates heat from the heat conducting portion;

25 image displaying means disposed in the vicinity of the outgoing end of the light guiding means of the illumination apparatus; and

projection optical means for imaging an image of  
the image displaying means on a projection plane.